DOCUMENT RESUME

ED 464 424 EA 031 671

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TITLE Year-Round Education in a Reform Environment: The Impact on Student Achievement and Cost-Effectiveness Analysis.
PUB DATE 2000-07-06
NOTE 20p.
PUB TYPE Reports - Research (143)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Academic Achievement; Comparative Analysis; *Cost Effectiveness; Intermediate Grades; Program Effectiveness; *Year Round Schools
IDENTIFIERS Reform Efforts

ABSTRACT

The purpose of this study was to examine the impact of year-round scheduling on student achievement and attendance and to conduct a cost-efficiency analysis associated with year-round education. Participants were students who attended year-round school in the fourth and fifth grades (N=95) and students who attended schools with traditional calendars at the same grade levels matched on third-grade test scores and socioeconomic status (N=95). Multivariate and univariate analysis revealed no significant differences between students attending year-round schools and those attending schools with traditional calendars in both reading and math achievement and average percent attendance. Cost-efficiency analysis revealed that year-round schools were more expensive and less cost-effective than the regular-calendar schools in both reading and math. The main conclusion of this research is that the year-round schedule is not a panacea and that there are more elements that have to be taken into consideration when approaching the issue of student achievement. Research results show the need for holistic approaches that incorporate both school and nonschool variables, such as the roles teachers, schools, and parents play that can and do influence student achievement. (Contains 24 references and 2 tables.) (RT)

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Year-Round Education in a Reform Environment: The Impact on Student Achievement and Cost-Effectiveness Analysis

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July 6, 2000

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Abstract

The purpose of this study was to examine the impact of year-round scheduling on student achievement and attendance and to conduct a cost-efficiency analysis associated with year-round education. Participants were students who attended year-round school in the fourth and fifth grades (N=95) and students who attended schools with traditional calendars at the same grade level matched on third-grade test scores and socioeconomic status (N=95). Multivariate and univariate analysis revealed no significant differences between students attending year-round schools and those attending schools with traditional calendars in both reading and math achievement and average percent attendance. Cost-efficiency analysis revealed that year-round schools were more expensive and less cost-effective than the regular calendar schools in both reading and math. Implications for policy and administrative practice are discussed.

Year-Round Education in a Reform Environment: The Impact on Student Achievement and Cost-Effectiveness Analysis

In our post-industrial era, the school's distribution of time is being challenged to address new societal needs. As a response to the critiques on the traditional use of time, the community of educators is considering new ways of rearranging the school calendar. One avenue that is being explored by school districts across the country is the concept of the year-round education. While year-round has become a highly attractive alternative to the traditional calendar; it has also proved to be a very debatable topic in the educational arena. For instance, at this time, year-round programs embrace at least over 60 different methods of calendar arrangements (Huyvaert, 1998).

Despite the current attractiveness of year-round education, the conception of year-round education is not a new educational notion. Year-round programs began in American schools some decades ago. However, the year-round programs were thought as a natural extension of the traditional year calendar with the primary goal of addressing the English language needs for immigrants children (Glines, 1995).

Today, many educators perceive the length of the school year as an anachronism. Critics have frequently pointed to the inherent inadequacy of the long summer vacation system. The three-month vacations can be harmful from an educational perspective. Students need consistent attention in order to make and sustain steady progress: the long summer vacations can be educationally devastating. In addition to regular courses, the summer provides an opportunity for enrichment activities. As a result of the potential losses associated with summer breaks, educators are rethinking of the relationship between time and learning.

Schools are looking for ways to let the schedule grow out of learning needs. They are seeking to make time a function of learning. The changes take at least three forms: altering school calendars and schedules, changing the pace at which student progress through the system, and rethinking the way time is used within the classroom (Fiske, 1991, p. 96).

According to Schlechty (1990; 1997), schools were originally designed to serve a rural agrarian society and the majority of the present day school calendars still revolve around the rural calendar. The agrarian practice grew out of the demand for farm labor. More specifically, four main reasons are given as explanation of the establishment of the rural calendar in the United States: (1) the need for child labor on the farm, (2) poor roads that made travel extremely difficult, (3) lack of resources led to early school closing, and (4) the failure to see the value of a good education (Glines, 1995). The nine-month calendar became the norm in the nineteenth century. In this sense, the school calendar is one of the few institutions that still maintain the same calendar, even after the changes in the economic system. Today in the United States, the three months summer vacation is considered by some educators as a sacred right not to be taken away. Resistance to change can be a major component that hinders any educational innovation.

The current debate is strong in relationship to year-round schooling. According to the National Education Commission on Time and Learning (1994), the 180-day school year should be relegated to our educational past. Both learners and educators need more instructional time. The report "Prisoners of Time" argues the need for a radical change in the school calendar. The report presents the need of reinventing the schools around learning and not time. In that sense, the emphasis has turned toward using time in new and better ways to make it a factor supporting learning and not a boundary that limits it.

The current research-based findings on the implementation of year-round schooling in the American school system are growing everyday. In earlier studies, students attending year-round schools demonstrated major gains in reading, mathematics, and language as they progress from fourth to eighth grades (Shepherd & Baker, 1977). These researchers argued that the effects of year-round programs on student achievement might not be seen until the students have been in the program for at least four years. Similarly, Peltier (1991) found that elementary and junior high students' scores on the state's annual reading, writing, and mathematics have increased since the implementation of the extended school year.

Other studies using comparison schools (i.e. schools with traditional schedules) have also found positive effects of year-round schools. Alcorn (1992) conducted research comparing the achievement of students participating in a year-round program and those in schools with traditional calendars. Students in grades three, five, and six were tested in reading, language, and mathematics using the California Assessment Program and the California Test of Basic Skills. Overall findings indicated that students in the year-round school had higher scores than those in schools with traditional school calendars. Others have found significant gains in reading scores for elementary students attending year-round programs when compared to control schools (Gandara & Fish, 1994).

The differences between year-round and traditional calendars have been documented at both the beginning and end of elementary school. Roby (1995) conducted research to determine the effects of year-round education on sixth-grade student achievement in reading and mathematics. Two elementary schools (i.e., year-round school, and traditional school) were selected based on similarities in the total number of sixth graders in each building. Findings

indicated that the year-round school participating in the investigation showed a statistically significant difference in both reading and mathematics. More recently, Frazier-Gustafson and Koenig (1999) conducted an investigation to analyze the impact of year-round schooling on low-income children's school adjustment. Participants were kindergartners (N = 78) on a year-round schedule and on a traditional schooling program. Participants were given measures of vocabulary, reading, math, and general knowledge. Teachers also rated children's social skills and teacher-child relationship. Findings indicated that while both groups began with the same achievement skill level, year-round students made more progress during kindergarten in vocabulary and general knowledge. Year-round schooling also had a positive impact on problem behaviors and teacher-child closeness.

Indeed, not all studies have found a strong positive relationship between year-round schedules and student achievement. Findings from a meta-analysis of 15 studies over the past 10 years on the topic of year-round schedules revealed that while students participating on the year-round program achieved at higher levels, the effect size was relatively small (Kneese, 1996). Zykowsky, Mitchell, Hough, and Gavin (1991) conducted a review of year-round education research. These researchers conducted an extensive achievement comparison of second-, fifth-, and seventh-graders attending traditional and year-round schools. All students were given the Comprehensive Test of Basic Skills. Findings indicated no statistically significant difference in student achievement between year-round students and traditional school students.

Likewise, Campbell (1994) conducted an investigation to compare the achievement of at-risk elementary students in a year-round school with the achievement of at-risk students in a traditional calendar school. The researcher found no statistically significant differences between

the two groups of students at the end of two consecutive school terms in both achievement and attendance.

In summary, research findings have shown mixed results in term of student achievement when comparing traditional schools and year-round schools. However, recent studies have tended to be more favorable to the year-round schools' student achievement (Winters, 1995; Kneese, 1996). In addition, researchers have great concerns regarding the issue of isolating the effects of year-round programs. Confounding variables such as demographic variables, length of time of implementation of year-round, class size, and purpose of implementation are present (Kneese, 1996). Furthermore, researchers in the area of year-round education suggest that future studies need to include a longitudinal component instead of analyzing the program in cross-sectional approaches. The current study is an effort to respond to some of these educational research challenges.

The increasing amount of research in this area is evidence of the growing concern of the American school system as to whether allowing more time to all students will result in higher levels of achievement. In this sense, the primary purpose of this study was to examine whether the restructuring of the instructional school year is worth the effort in terms of academic achievement in both reading and mathematics. Another objective of this research was to explore the impact of a year-round program in terms of a cost-effectiveness analysis.

The specific research questions that this study examined arose from a comprehensive review of the literature on year-round education. In the present study, data were analyzed to answer the following research questions concerned with student achievement and cost-effectiveness: (a) Do students in year-round schools have statistically significant different

standardized testing scores when compared with students in traditional school calendars?; (b) Do students in year-round schools have statistically significant different attendance percent when compared with students in traditional school calendars?; and (c) What is the cost-efficiency of the year-round schools when compared with traditional school calendars?

Methods

Participants

The research participants were elementary school students of a large southeastern school district in the United States (N = 190 students). The school district is located in an urban setting and has approximately 151 educational centers with an enrollment of over 95,000 students. Sixty percent of the elementary school population receives free or reduced price lunch. As many other school systems in the United States, the mission of the district is to guarantee that every student will acquire the fundamental academic and life skills necessary for success in the classroom, workplace and community. A distinguishing characteristic of the school district under examination is that the use of time is one of the fundamental areas of concentration.

The sample for the treatment group (i.e., year-round education) consisted of ninety-five students who attended three schools following a year-round schedule during the fourth and fifth grades. Two schools follow a 45-15 single track schedule and one school follows a flexible schedule that alternates between 4- and 5-day weeks of compulsory attendance. The 4-day week is supplemented with a fifth day of optional enrichment activities.

The sample for the comparison group (i.e., regular schools) consisted of ninety-five students attending schools with traditional calendars and at the same grade levels. Since previous research shows the impact of poverty on academic performance (Munoz, Clavijo, & Koven,

1999; Munoz & Dossett, 2000; Dossett & Munoz, 2000), the students attending schools with regular calendars were matched with year-round students on their socioeconomic status. The socio-economic status was measured by participation in the national free and reduced lunch program (FRL). The national program classified the students based on their socio-economic status into three categories: free, reduced price, and paid lunch.

The students attending schools with traditional calendars were also matched with the students attending year-round schools on their third-grade Comprehensive Test of Basic Skills (CTBS) total battery scores in order to control for any initial differences in achievement between the two groups. The CTBS total battery includes the subject areas of language, mathematics, and reading. CTBS is a nationally standardized achievement test and scores are reported in mean Normal Curve Equivalents (NCE). A NCE ranges from 1 to 99 with an average of 50. The CTBS is a norm-referenced test designed to measure achievement in the basic skills and commonly found in state and school district curricula (Krammer, Conoley, & Murphy, 1992).

Instrumentation

The fundamental independent variable in the study was the year-round grouping variable. The variable was dummy coded, such that students not attending year-round schools were coded as zero and students attending year-round schools were coded as one. Multiple dependent variables were included in the statistical analyses. All of the data for the dependent variables were obtained using the databases of District's Management Information Systems for the 1996/1997 to 1999/2000 school years.

The dependent variables included cognitive and non-cognitive variables. The cognitive variables were the Stanford Diagnostic Reading Test (SDRT) and the Stanford Diagnostic Math

Test (SDMT) scores. The non-cognitive variable that was incorporated in the analysis was average percent attendance. Average percent attendance for each student was calculated for the years in which he/she was in fourth and fifth grades. The calculation of average percent attendance was performed using the formula: days membership minus days missed divided by days membership.

The SDRT and SDMT are valid and reliable instruments commonly used in educational research. The SDRT scores were the sixth-grade NCE scores for the total battery consisting of phonetic analysis, vocabulary, comprehension, and scanning subtests. The SDMT scores were the sixth-grade NCE scores for the total battery consisting of concepts and applications and computation subtests. The Stanford Diagnostic Tests are given at the beginning of the fall semester of the school year.

Design and Procedures

The research design was quantitative and comparative in nature (Gall, Borg, and Gall, 1996). Multivariate and univariate statistical procedures were conducted on the academic and nonacademic measures, respectively. Multivariate tests are the recommended procedures when there is more than one dependent variable (Stevens, 1996). In this study, one grouping variable (i.e., year-round and regular calendar schools) and two measures of academic performance were included (i.e., reading and mathematics testing scores). The recommended statistical method was the Hotteling T-squared procedure (Stevens, 1996). The univariate statistical procedure used in this study was the independent sample t-test having as the dependent variable the percent of attendance and as independent variable the year-round/non-year round membership (i.e., grouping variable).

Since it has become relevant to study the economic impact of the year-round configuration of schooling, an additional analysis was conducted to assess the effectiveness of the year-round versus the regular calendar program. A cost-effectiveness analysis was performed to study the relationship between costs and academic achievement in both year-round and non-year round schools (Levin, 1983). All data was entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 9.0.

Results

The gender composition was 47% female and 53% male for the year round students and 50% female and 50% male for the comparison group. The racial composition for the year-round students was 54% Caucasian, 42% African American and 4% Other. For the comparison group, the racial composition was 60% Caucasian, 37% African American and 3% Other. The socioeconomic composition, as measured by free/reduced lunch status, was 56% free lunch, 15% reduced priced lunch, and 29% paid lunch for both the year-round and comparison students. This sample can be characterized as at-risk since it includes 71% students on free and reduced priced lunch in both groups.

The first step was to perform basic descriptive analysis of the dependent variables that would participate in the multivariate analysis (See Table 1). Due to the matching procedure, the third-grade CTBS scores were identical for students attending year-round schools and those in the comparison group. However, the sixth-grade reading and math test scores were lower for the year-round students than their comparison group. For both the year-round and comparison group, the reading scores were higher than the math scores. Percent attendance was higher for students attending the year-round schools than those in the comparison group.

[Insert Table 1 about here]

Statistical and Cost-Effectiveness Analyses

The assumptions of independence of observations, normality and equality of variance were met for conducting multivariate procedures (Stevens, 1996). The multivariate test, Hotelling's Trace, revealed no significant main effect of year-round, $F(187) = .99$, $p = .38$. In addition, there was not effect of year-round on Stanford Reading or Math test scores, $F(1) = .18$, $p = .67$ and $F(1) = 1.78$, $p = .18$, respectively.

A separate independent samples T-test revealed no significant difference in average percent attendance between students attending schools with year-round schedules and those students attending schools with traditional calendars, $t(188) = 1.62$, $p = .11$.

As presented in Table 2, year-round schools had higher expenditures per pupil than schools with traditional calendars. Test scores in both reading and math for year-round schools were lower than test scores of regular calendar schools. The cost-effectiveness was inferior in both reading and math for year-round schools as compared to regular calendar schools. For year-round schools, a one-point gain in reading achievement would cost $8 more than the same gain would for regular calendar schools. Likewise, a one-point gain in math achievement would cost $14 more for year-round schools than regular calendar schools. Math achievement is associated with higher cost-effectiveness for both year-round and regular calendar schools.

[Insert Table 2 about here]

Discussion

Year-round is a topic that has attracted nation-wide attention of educational administrators and teaching professionals. The traditional school calendar has been challenged to address the particular needs of the post-industrial society. Many educational researchers consider year-round education to be the best approach to meet the needs of our students. The results of this study did not show a positive significant impact on cognitive variables of the year-round program when compared to a matched group of the regular calendar program. The comparison group had higher reading and mathematics test scores. In addition, this research demonstrated that the year-round program was more expensive and less cost-effective than the regular calendar program in both reading and mathematics. Concerning the non-cognitive variable, the average percent of attendance was lower for students in the comparison group than those attending year-round schools. This finding shows the importance of examining non-cognitive factors when investigating the impact of the year-round schedule and not limiting it to only academic measures.

The limitations of this study are various, namely sampling procedures and generalizability of findings. First, the generalizability of findings is limited to the particular school district and grade levels from which the data was collected. Participants from other geographical locations or grade levels (i.e. primary, or high school) might demonstrate different results in terms of academic performance and attendance. Second, this study examined the impact of the year-round program at the end of two consecutive school years; the results might be different if the same analysis were to be conducted for a longer period of implementation. Finally, any educational

process embraces both teachers and students; in this research, however, no data were included to compare the teacher involvement in both types of educational calendar arrangements.

Further research has to examine the impact of year-round programs using longitudinal research approaches and comparing the sustainability of gains for both year-round and regular calendar schools. Future research using experimental research designs should be more comprehensive. Factors such as teacher, school, and parent variables are critical elements to understand the impact of determined programs on student achievement.

The main conclusion of this research is that year-round is not a panacea. This study has shown the limitations of re-arranging the school calendar because the use of time explains only part of the issue of student achievement. This research confirms the need for holistic approaches that incorporate both school and non-school variables. Educational reforms that pretend to be successful should continue developing mechanisms that overcome the barriers for learning and that create school-student-parent relationships truly oriented toward learning. These relationships are critical elements in an educational partnership that promotes equity and excellence in learning. The basic idea is to develop new educational paradigms that incorporate support services with strong inter-relationships among students, school, and families.

Although the idea of year-round education is appealing from a theoretical perspective, re-arranging the traditional calendar is not the unique factor that explains educational achievement. This research showed that there are more elements that have to be taken into consideration when approaching the issue of student achievement. The idea of seeking to make time a function of learning is good. In fact, the calendar should be in function of student learning and not the opposite. However, other elements such as leadership, research-based teaching practices, morale,

professional development, parental involvement, and planning and evaluation are essential tasks for developing a high-performing school. This is why the area of education is such a challenging arena for research and evaluation.

Educational change is a very complex area. It requires more than a simple re-arrangement of the school calendar. A review of a school's learning environment and academic performance to determine the level of support necessary to improve student academic and non-academic performance should be the first step of any organizational change strategy. In this endeavor, the leadership role is essential in terms of creating and establishing a shared vision, defining standards, and allocating resources. Still, these multi-factor educational interventions will be more likely to success if they are accompanied by continuous assessment and evaluation.

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Table 1

Descriptive Statistics (N = 190)

Variable	Year Round Group	Comparison Group
3rd grade CTBS (matching)	52.82	52.82
3rd grade FRL (matching)	71%	71%
6th grade SDRT	43.04	44.07
6th grade SDMT	39.62	43.44
Avg. Percent Attendance	96.52	95.66

Table 2

Cost-Effectiveness of Year-Round Schools Compared with Regular Calendar Schools in Reading and Math (1997/98 – 1998/99)

Program	Expenditures Per Pupil	Reading Test Scores	Math Test Scores	Reading Cost-Effectiveness	Math Cost-Effectiveness
Year-Round	$3,373.00	43.04	39.62	$78.37	$85.13
Regular Year	$3,122.00	44.07	43.44	$70.84	$71.87

Note: The expenditures per pupil are calculated by dividing the total budget per school by their average daily attendance and represent the average cost per student in the 1997-1998 and 1998-1999 school year. The test scores are based on the Stanford Reading and Math Diagnostic Tests and are expressed as Normal Curve Equivalents.

N = 3 Schools with Year-Round; N = 55 Schools with Regular Calendar